

The Independent Opener Drill's Impact on Crop Growth and Development

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Abstract

There has been a rapid adoption of independent opener drills by Saskatchewan farmers due to these machines superior depth control precision. In 2008 and 2009 crops grown by an independent opener drill (Morris Contour) were compared to a traditional air hoe drill (Morris Maxim II). A visual improvement in above ground biomass was noted in cereal crops. This resulted in a consistent yield improvement (~5% increase) in these crops in 2008. There was no visual difference in biomass or yield between the two machines with canola. In 2009 early season emergence counts revealed that there was no difference in emergence between the two machines. This suggests differences in biomass were not due to superior emergence resulting from improved depth control precision improved fertilizer-seed separation with the different ground engagement tools used with each machine. Rather, the improved biomass development offered by the Morris Contour drill appears to be due to the increased seed bed utilization of the paired row opener. Yield improvements in 2009 were limited to barley (~5% increase). The lack of yield response with wheat in 2009 and canola in both years may be due to yield compensation by these crops. It appears that independent opener drills may help develop higher yield potential than traditional air hoe drills. Realizing this yield potential will be dependent on farming practices, the crops grown, as well as the climate during critical development phases of these crops.

Materials and Methods

In 2008 and 2009 Morris conducted farm scale comparisons of their new independent opener drill, the Morris Contour drill to a Morris Maxim II spring trip drill in Kelvington, SK. Fields were split so that half the field was planted by one drill and the other half was planted by the other drill. Fertilizer rates, seeding rates, seeding speed and seeding depth were kept equivalent for the comparisons. Three crops were evaluated: wheat, barley and canola. Yield data presented is a composite average crop yield based on a number of fields. Yield data was captured by yield monitors in the combines at harvest and was crosschecked against a grain cart equipped with a scale to ensure accuracy.

The air drills used for comparison in this study were a Morris Maxim II with Atom Jet liquid sideband openers with 10 inch shank spacing and a Morris Contour drill with Morris paired row openers. The shank spacing of the Contour drill was 10 inch in 2008 and 12 inch in 2009. Each machine was expertly set and operated, hence the results should reflect top performance for each machine.

Results and Discussion

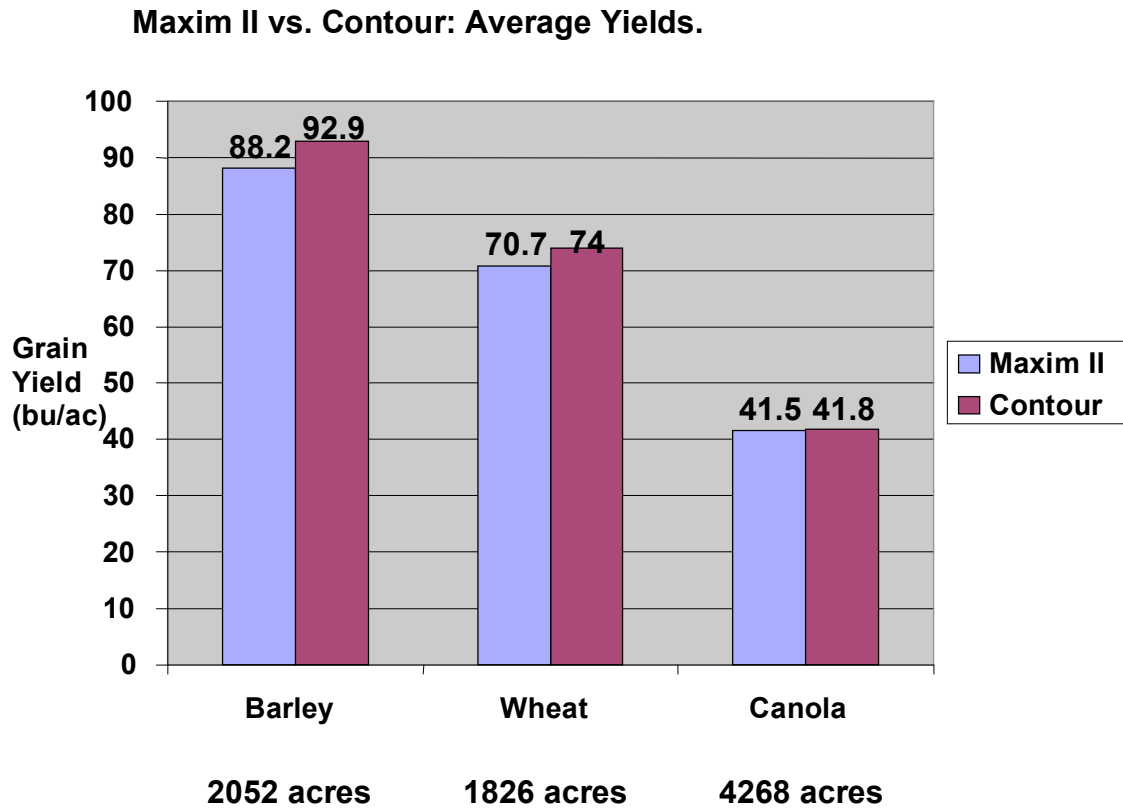
In 2008 strong visual differences were noted between the crops grown from each drill. Figure one is a photo of wheat cv. AC Crystal at a flag leaf stage. The crop planted by the Morris Contour drill possessed a dense canopy with a darker green appearance compared to the crop planted by the Morris Maxim II drill.

Figure 1. Biomass of CPS Wheat at GS 37.



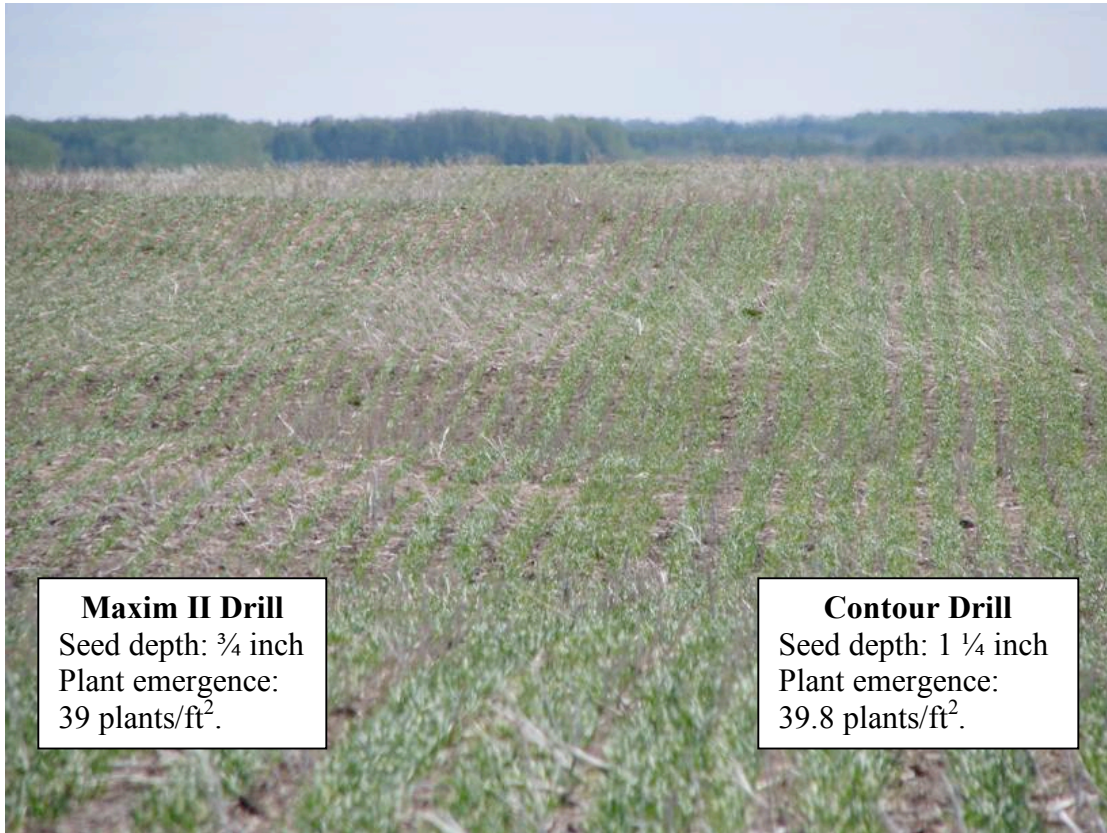
The crop yield results for 2008 (Figure 2) demonstrated that the Morris Contour drill consistently improved cereal crop yields by approximately 5%. There was no difference in yields in canola crops planted by either machine. Canola crop establishment with each machine was excellent. The lack of canola yield response may be due to extra branching of canola later on in crop development masking any small differences that may have existed in the canola crops planted by each machine.

Figure 2. 2008 Crop Yield by Crop Type.



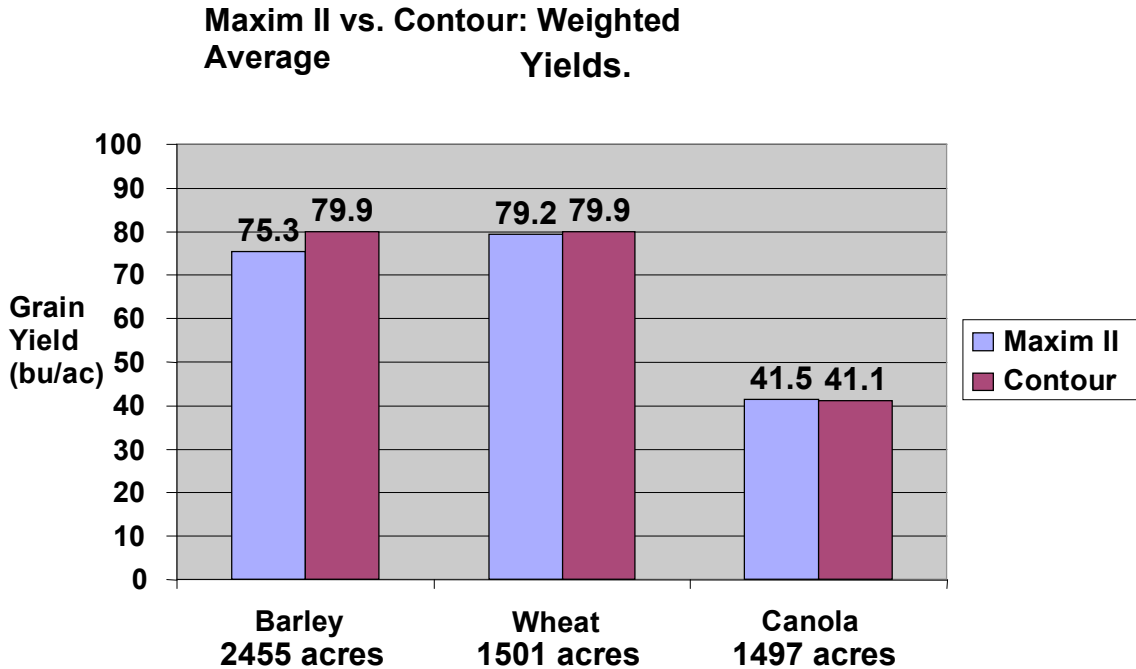
In 2009, crop emergence counts were conducted to investigate why there appeared to be differences in crop biomass between crops planted by the Contour drill and the Maxim II drill. While there were visual differences in early crop biomass development (Figure 3), there were no differences in the number of emerged barley plants per square foot. This allows us to conclude that differences in crop above ground biomass are not related to crop emergence as affected by the more consistent depth control or superior fertilizer seed separation with the Morris Contour. The difference in biomass appears to be due to the increased seed bed utilization of the paired row opener compared to the sideband opener.

Figure 3. 2009 Emergence of Barley cv. Legacy.



Harvest was completed in November of 2009. The yield improvements observed with crops planted by the Morris Contour were less consistent than the previous year (Figure 4). Barley was the only crop planted by the Contour drill with improved yields. The lack of yield response in wheat may be due to yield compensation (increased number of kernels per head) as the climate was maximizing yield expression during flowering and seed set.

Figure 4. Average Yield by Crop.



Conclusions.

Based on farm scale evaluation in 2008 and 2009, it appears that independent opener drills such as the Morris Contour drill may help crops develop higher yield potential than traditional air hoe drills. Much of the interest in independent opener drills has been due to improved depth control precision for small seeded crops such as canola. In this study the yield responses to the independent opener drill were only realized with cereal crops. Realizing this yield potential will be dependent on farming practices, the crops grown, as well as the climate during critical development phases of these crops.